

marsh gas and other gases are generated which become explosive when mixed with oxygen and fired. During the past six months three explosions of septic tanks have occurred, viz. at Exeter, Walton-on-Naze, and Sheringham; in the last named three persons were killed and several injured.

A PARLIAMENTARY paper has been issued by the Colonial Office containing official correspondence and circulars relating to the investigation of malaria and other tropical diseases, and the establishment of schools of tropical medicine. It contains a circular letter to the Governors of all colonies upon the investigation of tropical diseases and the establishment of the London School of Tropical Medicine, a summary of researches upon malaria by Drs. Stephens and Christophers, a despatch from Sir William MacGregor relating to the prevalence and prevention of malaria at Ismailia, and a despatch from Sir F. A. Swettenham upon the work done at the Institute for Medical Research, Federated Malay States. The increasing importance of the study of tropical medicine has been recognised by the Special Board of Medicine of Cambridge University, which has proposed to institute a special examination and to grant a diploma in tropical hygiene and medicine.

A PAPER read before the Royal Dublin Society by Dr. H. H. Dixon offers a reply to some criticisms passed on the cohesion theory of the ascent of sap which was proposed by the author and Dr. Joly. There seems to be a difficulty in the minds of some botanists in accepting this hypothesis if the column of water contains air-bubbles. As Dr. Dixon points out, this merely puts out of gear the particular cell in which the bubble appears. Another opinion which the author combats is that glass tubes containing plaster of Paris through which water passes may be taken as the equivalent of the water columns in trees. Experiments show that plaster continues for a long time to absorb water, and further, the amount varies with the changes of temperature.

THE appearance of a new scientific publication, *Records of the Albany Museum*, emanating from Grahamstown in South Africa is a matter for congratulation, whether it is offered to the director, Dr. Schönland, or in so far as it furnishes an indication of the sign of the times. Dr. R. Broom contributes three palæontological articles, in the first of which he describes the skull of a small lizard taken from the Triassic beds in South Africa. Dr. Schönland is responsible for the remainder of this, the first part. A critical account of a number of species of South African aloes adds considerably to the information collected by Mr. J. G. Baker in his monograph in the "Flora Capensis." In addition to the botanical papers, Dr. Schönland describes some Bushman and Hottentot pottery which is stored in the museum. A pot about 14½ inches high, consisting of a wide neck slightly ornamented by raised lines and a remarkably fine curved base, approximately oval, denotes workmanship of a higher order than that displayed by the civilised potter.

We have received the second part of the *Sitzungsberichte und Abhandlungen* of the Dresden "Isis" for 1902. The former contains an obituary notice of the late Hofrath Dr. H. Nitsche, professor of zoology at the Academy of Tharandt. Among the contents of the latter is an article, by Prof. O. Schneider, on the prevalence of melanism among the beetles of Corsica.

AN interesting case of "commensalism" is recorded by Dr. R. Horst in the May issue of the *Leyden Museum Notes* (vol. xxiii. part ii.). In Sabang Bay, Poeloe Weh, several

small fishes (*Amphiprion intermedius*) were observed to issue from the cavity of a large anemone of the genus *Discosoma*. Several previous instances of a similar association are on record, notably in Australian waters, where other species of *Amphiprion* have been observed frequenting anemones of the genus above mentioned.

OUR knowledge of the fishes of Africa is progressing by rapid strides, one of the latest contributions to the subject being a paper on a collection from Zanzibar, by Mr. H. W. Fowler, published in the *Proceedings* of the Philadelphia Academy, in the course of which two species are described as new. The same serial also contains a revision of the land and fresh-water molluscs of Western Arkansas and the adjacent States, by Mr. H. A. Pilsbry.

WE have received a copy of the address on "Modern Views on Matter: the Realisation of a Dream," delivered by Sir William Crookes before the recent Congress of Applied Chemistry at Berlin. A general account of the proceedings of the congress appeared in NATURE of June 18 (p. 156), and abstracts of some of the papers brought before the various sections are given in the present number.

THE additions to the Zoological Society's Gardens during the past week include a Patas Monkey (*Cercopithecus patas*) from West Africa, presented by Mr. H. Padgett; two Two-spotted Paradoxures (*Nandinia binotata*) from West Africa, presented by Mr. Charles R. Palmer; a Burrowing Owl (*Speotyto cunicularia*) from South America, presented by Mr. L. M. Seth-Smith; a Diademed Sand Snake (*Lytorhynchus diadema*), five Egyptian Eryx (*Eryx jaculus*) from Egypt, two Bull Frogs (*Rana cotesiana*) from North America, deposited; six American Flying Squirrels (*Sciuropterus volucella*) from North America, purchased; an Ogilby's Rat Kangaroo (*Bettongia penicillata*) born in the Gardens.

## OUR ASTRONOMICAL COLUMN.

REPORTED CHANGE ON SATURN.—The following telegram, announcing the discovery of a new phenomenon on Saturn by Prof. Barnard, has been received from the Kiel Centralstelle:—

"Conspicuous white spot, Saturn, three seconds north, transit June 23, 15h. 47.8m., Williams Bay time.—Barnard."

SEARCH EPHEMERIS FOR FAYE'S COMET.—A search ephemeris for Faye's comet, from which the following is an extract, is published in No. 3876 of the *Astronomische Nachrichten* by Prof. E. Strömgen:—

1903		<i>Ephemeris 12h. (Berlin M.T.).</i>		log $r$		log $\Delta$	
	$\alpha$	$\delta$					
	h.	m.	s.				
July 2	4	59	44	... +18	41'8	...	0'2240
" 6	5	11	28	... +18	42'6	...	...
" 10	5	23	6	... +18	40'2	...	0'2281
" 14	5	34	37	... +18	34'7	...	0'4044
" 18	5	46	0	... +18	26'1	...	0'2330
" 22	5	57	14	... +18	14'5	...	0'4028
" 26	6	8	19	... +18	0'0	...	0'2386
" 30	6	19	13	... +17	42'8	...	0'4012

This ephemeris is calculated from the elements previously published, in the *Astronomische Nachrichten*, by the same worker, and takes June 3.64 (Berlin M.T.), 1903, as the time of perihelion passage. The comet will rise about two hours before sunrise towards the middle of the month.

OBSERVATIONS OF NOVA GEMINORUM.—Prof. Barnard publishes in No. 5, vol. xvii., of the *Astrophysical Journal* the results of his observations of Nova Geminorum; most of these observations were made with the finders of the 40-inch and 12-inch refractors of the Yerkes Observatory.

During the first set of observations the Nova had a strong reddish colour, but this has since disappeared.

Observations made in order to determine whether the light of this Nova exhibited the change of focus observed in the light of Nova Persei gave at first, negative results, but careful observations made on April 27 indicated that the light of the Nova, when compared with that of an ordinary star, showed a difference of  $\pm 0.08$  inch (2.00mm.) in focus.

The crimson image observed on March 30 had disappeared on April 27, the out-of-focus image of the Nova then resembling that of an ordinary star. Cloudy weather at Yerkes from April 7-27 prevented Prof. Barnard from determining the exact date at which this change took place. The magnitude of the Nova is exhibiting the same periodical fluctuations as were observed in the case of Nova Persei.

**THE RED SPOT ON JUPITER.**—In No. 3875 of the *Astronomische Nachrichten*, Mr. Stanley J. Williams describes, and gives the detailed results of, his observations of the "great red spot" during the opposition of 1902.

Transit observations of the middle of the spot gave a rotational period of 9h. 55m. 39.55s., and of the "following" end of the spot 9h. 55m. 39.88s.; taking the weighted mean of these observations, Mr. Williams obtains, from 275 rotations, 9h. 55m. 39.66s. as the result. This shows a further considerable acceleration of the rotational period of the red spot, amounting to 1.26s., as compared with the result obtained during the opposition of 1901.

**THE STUDY OF VERY FAINT SPECTRA.**—In a dissertation published in No. 35 of the Lick Observatory *Bulletins*, Mr. Harold K. Palmer describes an arrangement whereby the Crossley reflector has been adapted to the study of very faint stellar and nebular spectra.

The work was first suggested, but not completed, by the late Prof. Keeler for the purpose of obtaining, amongst other spectra, the spectrum of the faint central star of the ring nebula in Lyra.

A modified form of Prof. Keeler's proposed spectroscope has now been adopted, and the results obtained with it are very satisfactory; its essential features are as follows:—A concave quartz lens intercepts the converging beam of light from the large mirror, and renders the rays parallel; these parallel rays are then refracted by a  $50^\circ$  quartz prism and are focused on to the photographic plate by a convex quartz lens placed between the prism and the plate. The two lenses and the prism each have an aperture of 25 mm. An arrangement attached to the prism cell allows the prism to be moved to one side, so that the spectroscope may be focused for the incident light by means of an eye-piece which carries a finely divided scale, and another eye-piece, placed at the side of the movable slipping plate, allows the "following" during exposure to be performed in the usual manner.

Spectrograms of such faint objects as the stellar nebula NGC 6807 (magnitude 13), the Novæ in Perseus (1901), Auriga and Cygnus (1876), and the Wolf-Rayet star No. 43 have been obtained with exposures varying from one to four hours, and show a fair amount of detail.

Three spectrograms of the ring nebula were obtained, two with thirty minutes' and one with two hours' exposure, but the only trace of the central star is a faint line which appears on all three plates, and, in the longer exposure, shows a faint dot in a position a little to the more refrangible side of the condensation  $\lambda$  373 in the nebula ring. A detailed description of each of the spectra obtained is given in Mr. Palmer's paper.

#### INSTITUTION OF NAVAL ARCHITECTS.

THE Institution of Naval Architects held its summer meeting this year in Ireland, commencing Tuesday, June 23, when the opening meeting was held in Queen's College, Glasgow, the president of the Institution occupying the chair.

After the usual formal proceedings, in which the members were welcomed to the city by Sir Daniel Dixon, the Lord Mayor of Belfast, and the Rev. Dr. Hamilton, president of Queen's College, three papers were read. The first was by Mr. C. F. L. Giles, the engineer to the Belfast Harbour Commissioners, and gave a brief description of the harbour and its development. Mr. E. H. Tennyson D'Eyncourt followed with a paper "On Fast Coaling Ships for our

Navy." The author proposed that certain vessels should be built specially to wait on the fleet and supply it with coal in time of war, and they should be fitted with appliances for transferring the fuel to the warships at sea. These vessels should be able to steam 17 knots easily and continuously, and 18 knots in case of emergency. They would have to be of considerable size, therefore, and would be loaded with 10,000 tons of coal, besides that needed for their own use. The author estimated that the requirements could be met on a length of 550 feet, a beam of 66 feet, and a draught of 27 feet with 10,000 tons of coal on board; that would enable the vessels to get through the Suez Canal. The horse-power necessary for 17 knots would be about 12,000. With quadruple engines the consumption of coal would be  $1\frac{1}{2}$  lb. per I.H.P. per hour, so that at full speed the collier could go 1000 miles from the coaling station and back on 800 tons of coal, carrying 10,000 tons of coal for the use of the fleet. That would be sufficient to coal completely five of our largest battleships or cruisers, or, if needed, ten such battleships could have their bunkers half full.

Comparing this with the present conditions, it would take one of our large cruisers or ironclads four or five days to make the 2000 miles, and she would lose at least 1000 tons of coal, and have to be steaming hard all the time. The vessel would arrive with dirty boilers, a tired complement of stokers, and the greater part of her coal already burnt. In ordinary peace time the colliers could be used for taking coal to the coaling stations. The cost of these vessels, fully equipped, with Temperley transporters and all the necessities for quick coaling, would be about 270,000l. each, so that four or five could be built for the cost of one first-class armour-clad or cruiser, whilst four could be kept in commission for about the cost of keeping up an armour-clad. In time of war, the author claimed, each collier would be equal to several additional warships, as it would enable so many of the latter to remain at sea, saving them the time of going to and fro for coal, and giving them an opportunity to clean their boilers and do minor repairs to the engines, besides resting the whole crew, officers and men. In the discussion which followed the reading of this paper, it was pointed out that it was more reasonable to transform a mercantile vessel into a collier in time of war than to build such vessels purposely for an occasion that might never arise.

Mr. James Hamilton, of Glasgow, next read a paper in which he described an ingenious means which he had devised for converting a moderate speed steamer into one of very high speed for war-like purposes. He pointed out that the extreme speed now demanded by the Admiralty for the new mercantile cruisers to which it was proposed to give subsidies was higher than could be used, with profit to the owners, during peace time for ordinary Transatlantic service. The Admiralty asked 25 knots; Mr. Hamilton put the limit for mercantile use at 22 knots. If engines are not worked up to the power for which they are designed, they are uneconomical in themselves, whilst for excessive speeds very great engine power is needed. In order to solve this difficulty, Mr. Hamilton proposes triple-screw steamers, with one central screw and two wing screws. For the 25-knot speed all three screws would be used, and their respective engines would therefore be at work at their full power, and so be operating economically; for the 22-knot speed the two wing screws only would be used, and in order to prevent the drag of the central, idle propeller, the latter is drawn forward, with its shaft, until the blades of the screw touch the stern-post of the ship. This stern-post is so formed that the blades lie snugly against it, and in this way the resistance of the water flowing past the idle propeller is got rid of. For a four-bladed screw the stern-post is made of cruciform shape by the addition of two horizontal wings. In the discussion on the paper, it was pointed out that the shape of the stern-post was not favourable to speed on account of the eddy-making resistance. Mr. Hamilton, in reply to the discussion, said, however, that the objection was not of so serious a nature as was supposed, supporting his contention by diagrams illustrating the stream-line theory.

On the second day of the meeting, Wednesday, June 24, Prof. J. H. Biles read a paper "On Cross-Channel Steamers," in the course of which he gave particulars of certain vessels, and discussed the different qualities needed